

**SKILLS FRAMEWORK FOR SEA TRANSPORT
TECHNICAL SKILLS AND COMPETENCIES (TSC) REFERENCE DOCUMENT**

TSC Category	Marine Engineering					
TSC	Electrical Design Approval					
TSC Description	Interpret electrical drawings and vessel design specifications to guide approval processes for power planning and installation of electrical systems					
TSC Proficiency Description	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6
		STP-OPR-2069-1.1	STP-OPR-3069-1.1	STP-OPR-4069-1.1		
		Verify sections of electrical drawings to reflect changes to existing systems in line with international codes, conventions, class rules and regulations	Review full-scale electrical drawings for power installations on vessels, including cable layout and switchboard schematics to aid in fault-finding and troubleshooting electrical systems	Evaluate new, large-scale and other high complexity electrical system drawings and advise on optimal drawing methods to create such drawings based on complexity, cost and time involvement		
Knowledge		<ul style="list-style-type: none"> International Convention for the Safety of Life at Sea (SOLAS) Chapter II-1 and International Electrotechnical Commission (IEC) codes and standards, class rules and other international regulations Principles of 2D and 3D engineering drawings used in designing vessels Types of electrical drawing symbols and conventions Methods of interpreting electrical drawings Applications of electrical drawings Basic principles of electrical engineering Types and capacities of electrical installations Types of computer-aided design (CAD) software relevant to 	<ul style="list-style-type: none"> International Convention for the Safety of Life at Sea (SOLAS) Chapter II-1 and International Electrotechnical Commission (IEC) codes and standards, class rules and other international regulations Methods of translating project requirements into 2D and 3D electrical drawings Methods of analysing electrical drawings ISO and other guidelines for engineering drawings Types and specifications of electrical cables Types and specifications of electrical equipment Types of electrical faults Methods of preventing electrical faults Concepts in mathematics pertinent to 	<ul style="list-style-type: none"> International Convention for the Safety of Life at Sea (SOLAS) Chapter II-1 and International Electrotechnical Commission (IEC) codes and standards, class rules and other international regulations Methods of translating project requirements into 2D and 3D electrical drawings Advanced principles of electrical engineering International regulations related to electrical engineering Methods of evaluating electrical drawing techniques 		

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		creating electrical drawings	engineering calculations and power planning			
Abilities		<ul style="list-style-type: none"> • Interpret electrical drawings • Translate hand sketches and tracing drawings into electrical drawings and plans based on examples and references • Operate CAD software to perform drawing verifications • Apply dimensioning layouts in engineering drawings • Carry out engineering calculations pertaining to electrical concepts • Determine differentiation factors between specifications of various electrical equipment 	<ul style="list-style-type: none"> • Apply electrical principles to concept designs • Review full-scale electrical drawings using 2D or 3D methods against class rules and international standards • Employ relevant methods of numerical analysis to derive power requirements for vessels • Interpret drawings to assist in analyses of planning and installation of engineering systems • Incorporate details of appropriate materials for electrical elements of projects in drawings • Incorporate electrical safety in drawings 	<ul style="list-style-type: none"> • Evaluate new, large-scale and other high complexity electrical system drawings using appropriate 2D or 3D methods • Review electrical drawings against international regulations and conventions, class rules and project requirements • Evaluate the feasibility of applying new electrical concepts to electrical systems • Identify efficient methods to develop electrical drawings based on complexity, cost and time involvement 		